

## WHAT IS CLAIMED IS:

1. A charge transfer-promoting material comprising a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein A is an organic moiety selected from the group consisting of fused ring radicals having from 2 to 5 rings, inclusive, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to A; M is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series; X is a halogen element; and n is an integer number selected from the group consisting of 1, 2, and 3.
2. A charge transfer-promoting material comprising a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein A is an organic moiety selected from the group consisting of crown ethers, cryptands, macrocyclic polyamines, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to A; M is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series; X is a halogen element; and n is an integer number selected from the group consisting of 1, 2, and 3.
3. The charge transfer-promoting material of claim 1; wherein A is a fused aromatic ring radical having from 2 to 3 rings, inclusive, and derivatives thereof.
4. The charge transfer-promoting material of claim 1, wherein M is an alkali metal.
5. The charge transfer-promoting material of claim 2, wherein A is a crown ether.
6. The charge transfer-promoting material of claim 2, wherein M is an alkali metal.

7. The charge transfer-promoting material of claim 2, comprising potassium triethoxysilylnapthalene.
8. The charge transfer-promoting material of claim 2, wherein A is 18-crown-6 and M is potassium.
9. The charge transfer-promoting material of claim 2, comprising a reaction product of compound VIII and potassium fluoride.
10. An article comprising a first metal and a charge transfer-promoting material disposed on the first metal; wherein the charge transfer-promoting material comprising a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein A is an organic moiety selected from the group consisting of fused ring radicals having from 2 to 5 rings, inclusive, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to A; M is a second metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series; X is a halogen element; and n is an integer number selected from the group consisting of 1, 2, and 3.
11. The article of claim 10, wherein A is a fused aromatic ring radical having from 2 to 3 rings, inclusive, and derivatives thereof.
12. The article of claim 10, wherein M is an alkali metal.
13. The article of claim 10, wherein the charge transfer-promoting material forms a layer on a surface of the first metal.
14. The article of claim 10, wherein the first metal and the second metal comprise the same metal.
15. The article of claim 10, wherein the first metal and the second metal are different metals.

16. The article of claim 10, wherein the first metal is aluminum and the charge transfer-promoting material comprises potassium triethoxysilylnaphthalene.

17. An article comprising a first metal and a charge transfer-promoting material disposed on the first metal; wherein the charge transfer-promoting material comprising a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein  $A$  is an organic moiety selected from the group consisting of crown ethers, cryptands, macrocyclic polyamines, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to  $A$ ;  $M$  is a second metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series;  $X$  is a halogen element; and  $n$  is an integer number selected from the group consisting of 1, 2, and 3.

18. The article of claim 17, wherein  $A$  is a crown ether.

19. The article of claim 17, wherein  $M$  is an alkali metal.

20. The article of claim 17, wherein the first metal is aluminum and the charge transfer-promoting material has a formula of  $AM^{n+}X_n^-$ , wherein  $A$  is 18-crown-6,  $M$  is potassium,  $X$  is fluorine, and  $n$  is equal to 1.

21. An electronic device comprising:

(a) a first electrode;

(b) a charge transfer-promoting material disposed on the first electrode, the charge transfer-promoting material comprising a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein  $A$  is an organic moiety selected from the group consisting of fused ring radicals having from 2 to 5 rings, inclusive, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is

covalently attached to A; M is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series; X is a halogen element; and n is an integer number selected from the group consisting of 1, 2, and 3;

(c) at least an electronically active material disposed adjacent to the charge transfer-promoting material; and

(d) a second electrode disposed adjacent to the electronically active material.

22. The electronic device of claim 21; wherein the electronically active material is an organic electroluminescent ("EL") material; the first electrode comprises a material selected from the group consisting of K, Li, Na, Mg, Ca, Sr, Ba, Al, Ag, In, Sn, Zn, Zr, Sc, Y, elements of lanthanide series, alloys thereof, and mixtures thereof;

23. The electronic device of claim 22, wherein the first electrode comprises aluminum.

24. The electronic device of claim 21; wherein the electronically active material is an organic EL material and is selected from the group consisting of poly(n-vinylcarbazole) ("PVK"), polyfluorene, poly(alkylfluorene), poly(paraphenylene), poly(p-phenylene vinylene), polysilanes, polythiophene, poly(2,5-thienylene vinylene), poly(pyridine vinylene), polyquinoxaline, polyquinoline, 1,3,5-tris{n-(4-diphenylaminophenyl) phenylamino}benzene, phenylanthracene, tetraarylethene, coumarin, rubrene, tetraphenylbutadiene, anthracene, perylene, coronene, and derivatives thereof.

25. The electronic device of claim 21; wherein the electronically active material is an organic EL material and is selected from the group consisting of aluminum-acetylacetonate, gallium-acetylacetonate, and indium-acetylacetonate, aluminum-(picolymethylketone)-bis{2,6-di(t-butyl)phenoxide}, scandium-(4-methoxy-picolymethylketone)-bis(acetylacetonate), organo-metallic complexes of 8-

hydroxyquinoline, and derivatives of organo-metallic complexes of 8-hydroxyquinoline.

26. The electronic device of claim 21, wherein the second electrode comprises a metal oxide selected from the group consisting of indium tin oxide ("ITO"), tin oxide, indium oxide, zinc oxide, indium zinc oxide, zinc indium tin oxide, antimony oxide, and mixtures thereof.

27. The electronic device of claim 21, wherein the electronically active material is an organic EL material, and the electronic device further comprises a photoluminescent ("PL") material disposed in a path of light emitted by the organic EL material.

28. The electronic device of claim 21, wherein the electronic device is a photovoltaic ("PV") cell, and the electronically active material is a PV material.

29. The electronic device of claim 28, wherein the PV material comprises an electron-accepting material and an electron-donating material disposed adjacent to each other, and the charge transfer-promoting material is disposed adjacent to the electron-donating material.

30. An electronic device comprising:

(a) a first electrode;

(b) a second electrode; and

(c) at least an electronically active material disposed between the first electrode and the second electrode; said at least an electronically active material being doped with a charge transfer-promoting material that comprises a material having at least a formula selected from the group consisting of AM,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein A is an organic moiety selected from the group consisting of fused ring radicals having from 2 to 5 rings, inclusive, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and

epoxy, and is covalently attached to A; M is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series; X is a halogen element; and n is an integer number selected from the group consisting of 1, 2, and 3.

31. The electronic device of claim 30; wherein the electronically active material is an organic EL material; the first electrode comprises a material selected from the group consisting of K, Li, Na, Mg, Ca, Sr, Ba, Al, Ag, In, Sn, Zn, Zr, Sc, Y, elements of lanthanide series, alloys thereof, and mixtures thereof.

32. The electronic device of claim 30; wherein the electronically active material is an organic EL material and is selected from the group consisting of poly(n-vinylcarbazole) ("PVK"), polyfluorene, poly(alkylfluorene), poly(paraphenylene), poly(p-phenylene vinylene), polysilanes, polythiophene, poly(2,5-thienylene vinylene), poly(pyridine vinylene), polyquinoxaline, polyquinoline, 1,3,5-tris{n-(4-diphenylaminophenyl) phenylamino}benzene, phenylanthracene, tetraarylethene, coumarin, rubrene, tetraphenylbutadiene, anthracene, perylene, coronene, and derivatives thereof.

33. The electronic device of claim 30; wherein the electronically active material is an organic EL material and is selected from the group consisting of aluminum-acetylacetonate, gallium-acetylacetonate, and indium-acetylacetonate, aluminum-(picolymethylketone)-bis{2,6-di(t-butyl)phenoxide}, scandium-(4-methoxy-picolymethylketone)-bis(acetylacetonate), organo-metallic complexes of 8-hydroxyquinoline, and derivatives of organo-metallic complexes of 8-hydroxyquinoline.

34. The electronic device of claim 30, wherein the second electrode comprises a metal oxide selected from the group consisting of indium tin oxide, tin oxide, indium oxide, zinc oxide, indium zinc oxide, zinc indium tin oxide, antimony oxide, and mixtures thereof.

35. The electronic device of claim 30, wherein the electronically active material is an organic EL material, and the electronic device further comprises a

photoluminescent material disposed in a path of light emitted by the organic EL material.

36. The electronic device of claim 30; wherein the electronic device is a PV cell, the electronically active material comprises an electron-accepting material and an electron-donating material disposed adjacent to each other, and the charge transfer-promoting material is doped into the electron-donating material.

37. The electronic device of claim 30, wherein both the first electrode and the second electrode comprise a substantially transparent, electrically conducting material.

38. An electronic device comprising:

(a) a first electrode;

(b) a charge transfer-promoting material disposed on the first electrode, the charge transfer-promoting material comprising a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^n M^{n+}$ ; wherein  $A$  is an organic moiety selected from the group consisting of crown ethers, cryptands, macrocyclic polyamines, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to  $A$ ;  $M$  is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series;  $X$  is a halogen element; and  $n$  is an integer number selected from the group consisting of 1, 2, and 3;

(c) at least an electronically active material disposed adjacent to the charge transfer-promoting material; and

(d) a second electrode disposed adjacent to the electronically active material.

39. An electronic device comprising:

- (a) a first electrode;
- (b) a second electrode; and
- (c) at least an electronically active material disposed between the first electrode and the second electrode; said at least an electronically active material being doped with a charge transfer-promoting material that comprises a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein  $A$  is an organic moiety selected from the group consisting of crown ethers, cryptands, macrocyclic polyamines, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to  $A$ ;  $M$  is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series;  $X$  is a halogen element; and  $n$  is an integer number selected from the group consisting of 1, 2, and 3.

40. A method of making a charge transfer-promoting material having a formula of  $AM$ ; wherein  $A$  is an organic moiety selected from the group consisting of fused ring radicals having from 2 to 5 rings, inclusive, and derivatives thereof; and  $M$  is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series; the method comprising reacting a compound having the organic moiety with the metal at a temperature and for a time sufficient to produce the charge transfer-promoting material.

41. The method of claim 40, wherein  $M$  is an alkali metal.

42. A method of making a charge transfer-promoting material having a formula of  $\{A-R^1-Si-O-(OR^2)_3\}^nM^{n+}$ , the method comprising:

- (a) reacting a material having a formula of  $A-R^4$  with  $(R^2O)_3SiH$  at a temperature and for a time sufficient to produce a first product; and



- (b) reacting the first product with a species comprising a metal M at a temperature for a sufficient time to produce the charge transfer-promoting material;

wherein A is selected from the group consisting of fused aromatic ring radicals having from 2 to 5 rings, inclusive, and derivatives thereof; M is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium yttrium, and metals of lanthanide series;  $R^1$  is selected from the group consisting of straight alkylene radicals having from 2 to 5 carbon atoms, inclusive, and branched alkylene radicals having from 2 to 5 carbon atoms, inclusive;  $R^2$  is selected from the group consisting of hydrogen, straight alkyl radicals having from 1 to 5 carbon atoms, inclusive, and branched alkyl radicals having from 1 to 5 carbon atoms, inclusive;  $R^4$  is a double bond-terminated hydrocarbon group having 2 to 5 carbon atoms; and n is an integer number selected from the group consisting of 1, 2, and 3.

43. The method of claim 42, wherein  $R^4$  is selected from the group consisting of  $-CH=CH_2$  and  $-CH_2-CH=CH_2$ .

44. The method of claim 42, wherein M is an alkali metal.

45. The method of claim 42, wherein the fused aromatic ring radicals comprise from 2 to 3 aromatic rings, inclusive.

46. A method for making an electronic device, the method comprising:

- (a) providing a first electrode comprising a first electrically conducting material;
- (b) disposing a charge transfer-promoting material on the first electrically conducting material;
- (c) disposing an electronically active material on the charge transfer-promoting material; and
- (d) providing a second electrode on the electronically active material;

wherein the charge transfer-promoting material comprises a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein  $A$  is an organic moiety selected from the group consisting of fused ring radicals having from 2 to 5 rings, inclusive, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to  $A$ ;  $M$  is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series;  $X$  is a halogen element; and  $n$  is an integer number selected from the group consisting of 1, 2, and 3.

47. The method of claim 46; wherein  $M$  is an alkali metal.

48. The method of claim 46, wherein said disposing said charge transfer-promoting material is carried out by a method selected from the group consisting of spin coating, spray coating, dip coating, roller coating, ink-jet printing, physical vapor deposition, and chemical vapor deposition.

49. The method of claim 46, wherein the electronically active material is selected from the group consisting of organic EL materials and PV materials.

50. A method for making an electronic device, the method comprising:

- (a) providing a first electrode comprising a first electrically conducting material;
- (b) disposing a charge transfer-promoting material on the first electrically conducting material;
- (c) disposing an electronically active material on the charge transfer-promoting material; and
- (d) providing a second electrode on the electronically active material;

wherein the charge transfer-promoting material comprises a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ;

wherein A is an organic moiety selected from the group consisting of crown ethers, cryptands, macrocyclic polyamines, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to A; M is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series; X is a halogen element; and n is an integer number selected from the group consisting of 1, 2, and 3.

51. A method of making an electronic device, the method comprising:

- (a) forming a first article, the forming of the first article comprising: (1) providing a first substrate; (2) forming a first layer on the first substrate, the first layer comprising a first electrically conducting material; (3) forming a second layer on the first layer, the second layer comprising a charge transfer-promoting material; and (4) forming a third layer on the second layer, the third layer comprising an electronically active material;
- (b) forming a second article, the forming of the second article comprising: (1) providing a second substrate; and (2) forming a fourth layer on the second substrate, the fourth layer comprising a second electrically conducting material; and
- (c) laminating together the first article and the second article such that the fourth layer is disposed adjacent to the third layer; wherein the charge transfer-promoting material comprises a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein A is an organic moiety selected from the group consisting of fused ring radicals having from 2 to 5 rings, inclusive, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to A; M is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series; X is a

halogen element; and n is an integer number selected from the group consisting of 1, 2, and 3.

52. The method of claim 51, wherein the electronically active material is selected from the group consisting of organic EL materials and PV materials.

53. A method of making an electronic device, the method comprising:

- (a) forming a first article, the forming of the first article comprising: (1) providing a first substrate; (2) forming a first layer on the first substrate, the first layer comprising a first electrically conducting material; (3) forming a second layer on the first layer, the second layer comprising a charge transfer-promoting material; and (4) forming a third layer on the second layer, the third layer comprising an electronically active material;
- (b) forming a second article, the forming of the second article comprising: (1) providing a second substrate; and (2) forming a fourth layer on the second substrate, the fourth layer comprising a second electrically conducting material; and
- (c) laminating together the first article and the second article such that the fourth layer is disposed adjacent to the third layer;

wherein the charge transfer-promoting material comprising a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ ,  $\{A-R^3\}^nM^{n+}$ ; wherein A is an organic moiety selected from the group consisting of crown ethers, cryptands, macrocyclic polyamines, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to A; M is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series; X is a halogen element; and n is an integer number selected from the group consisting of 1, 2, and 3.

54. The method of claim 53, wherein the electronically active material is selected from the group consisting of organic EL materials and PV materials.

55. The method of claim 53, wherein said laminating is carried out by bringing together the first article and the second article, and applying one of pressure or heat to the articles.

56. A method of making an electronic device, the method comprising:

- (a) forming a first article, the forming of the first article comprising: (1) providing a first substrate; (2) forming a first layer on the first substrate, the first layer comprising a first electrically conducting material; and (3) forming a second layer on the first layer, the second layer comprising a charge transfer-promoting material;
- (b) forming a second article, the forming of the second article comprising: (1) providing a second substrate; (2) forming a fourth layer on the second substrate, the fourth layer comprising a second electrically conducting material; and (3) forming a third layer on the fourth layer, the third layer comprising an electronically active material; and
- (c) laminating together the first article and the second article such that the second layer is disposed adjacent to the third layer;

wherein the charge transfer-promoting material comprising a material having material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein  $A$  is an organic moiety selected from the group consisting of fused ring radicals having from 2 to 5 rings, inclusive, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to  $A$ ;  $M$  is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series;  $X$  is a halogen element; and  $n$  is an integer number selected from the group consisting of 1, 2, and 3.

57. The method of claim 56, wherein the electronically active material is selected from the group consisting of organic EL materials and PV materials.

58. The method of claim 56, wherein said laminating is carried out by bringing together the first article and the second article, and applying one of pressure or heat to the articles.

59. A method of making an electronic device, the method comprising:

- (a) forming a first article, the forming of the first article comprising: (1) providing a first substrate; (2) forming a first layer on the first substrate, the first layer comprising an electrically conducting material; (3) forming a second layer on the first layer, the second layer comprising a charge transfer-promoting material; and (4) forming a protective layer on the second layer, the protective layer comprising a material that is capable of being removed to expose the second layer;
- (b) removing the protective layer to expose the second layer;
- (c) forming a third layer on the second layer, the third layer comprising an electronically active material; and
- (d) forming a fourth layer on the third layer, the fourth layer comprising a second electrically conducting material;

wherein the charge transfer-promoting material comprising a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein  $A$  is an organic moiety selected from the group consisting of fused ring radicals having from 2 to 5 rings, inclusive, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to  $A$ ;  $M$  is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series;  $X$  is a halogen element; and  $n$  is an integer number selected from the group consisting of 1, 2, and 3.

60. The method of claim 59, wherein the electronically active material is selected from the group consisting of organic EL materials and PV materials.

61. A method of making an electronic device, the method comprising:

- (a) providing a first layer of a first electrically conducting material;
- (b) forming a second layer on the first layer, the second layer comprising an electronically active material doped with a charge transfer-promoting material; and
- (c) disposing a third layer on the second layer, the third layer comprising a second electrically conducting material;

wherein the charge transfer-promoting material comprising a material having material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein A is an organic moiety selected from the group consisting of fused ring radicals having from 2 to 5 rings, inclusive, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to A; M is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series; X is a halogen element; and n is an integer number selected from the group consisting of 1, 2, and 3.

62. The method of claim 61, wherein the electronically active material is selected from the group consisting of organic EL materials and PV materials.

63. A method of making an electronic device, the method comprising:

- (a) forming a first article, the forming of the first article comprising: (1) providing a first substrate; (2) forming a first layer on the first substrate, the first layer comprising a first electrically conducting material; and (3) forming a second layer on the first layer, the second layer comprising a charge transfer-promoting material;

- (b) forming a second article, the forming of the second article comprising:
  - (1) providing a second substrate; (2) forming a fourth layer on the second substrate, the fourth layer comprising a second electrically conducting material; and (3) forming a third layer on the fourth layer, the third layer comprising an electronically active material; and
- (c) laminating together the first article and the second article such that the second layer is disposed adjacent to the third layer;

wherein the charge transfer-promoting material comprising a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^{n-}M^{n+}$ ; wherein  $A$  is an organic moiety selected from the group consisting of crown ethers, cryptands, macrocyclic polyamines, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to  $A$ ;  $M$  is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series;  $X$  is a halogen element; and  $n$  is an integer number selected from the group consisting of 1, 2, and 3.

64. The method of claim 63, wherein the electronically active material is selected from the group consisting of organic EL materials and PV materials.

65. The method of claim 58, wherein said laminating is carried out by bringing together the first article and the second article, and applying one of pressure or heat to the articles.

66. A method of making an electronic device, the method comprising:

- (a) forming a first article, the forming of the first article comprising: (1) providing a first substrate; (2) forming a first layer on the first substrate, the first layer comprising an electrically conducting material; (3) forming a second layer on the first layer, the second layer comprising a charge transfer-promoting material; and (4) forming a



protective layer on the second layer, the protective layer comprising a material that is capable of being removed to expose the second layer;

- (b) removing the protective layer to expose the second layer;
- (c) forming a third layer on the second layer, the third layer comprising an electronically active material; and
- (d) forming a fourth layer on the third layer, the fourth layer comprising a second electrically conducting material;

wherein the charge transfer-promoting material comprising a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X^{-n}$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein  $A$  is an organic moiety selected from the group consisting of crown ethers, cryptands, macrocyclic polyamines, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to  $A$ ;  $M$  is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series;  $X$  is a halogen element; and  $n$  is an integer number selected from the group consisting of 1, 2, and 3.

67. The method of claim 66, wherein the electronically active material is selected from the group consisting of organic EL materials and PV materials.

68. A method of making an electronic device, the method comprising:

- (a) providing a first layer of a first electrically conducting material;
- (b) forming a second layer on the first layer, the second layer comprising an electronically active material doped with a charge transfer-promoting material; and
- (c) disposing a third layer on the second layer, the third layer comprising a second electrically conducting material;

wherein the charge transfer-promoting material comprising a material having at least a formula selected from the group consisting of  $AM$ ,  $AM^{n+}X_n^-$ , and  $\{A-R^3\}^nM^{n+}$ ; wherein  $A$  is an organic moiety selected from the group consisting of crown ethers, cryptands, macrocyclic polyamines, and derivatives thereof;  $R^3$  is selected from the group consisting of alkoxy silane, carboxylic acid, thiol, amine, phosphine, amide, imine, ester, anhydride, and epoxy, and is covalently attached to  $A$ ;  $M$  is a metal selected from the group consisting of alkali metals, alkaline-earth metals, scandium, yttrium, and metals of lanthanide series;  $X$  is a halogen element; and  $n$  is an integer number selected from the group consisting of 1, 2, and 3.

69. The method of claim 68, wherein the electronically active material is selected from the group consisting of organic EL materials and PV materials.